

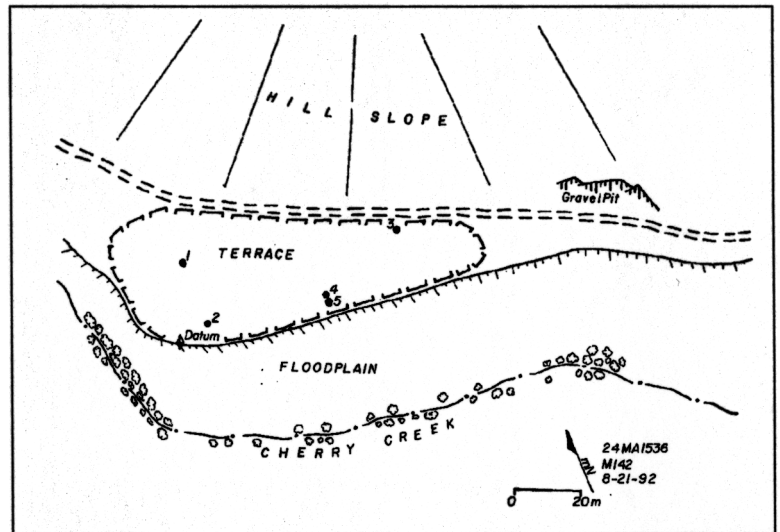
LESSON 1C—NARRATIVE: HOW DO ARCHAEOLOGISTS FIND AND STUDY ARCHAEOLOGICAL SITES?

Archaeologists work like detectives to find clues that help solve the mysteries of how past peoples lived. They use a variety of special methods to find and study **sites**, or the places of past human activity. Precise and accurate research methods are necessary to expose and **excavate** archaeological sites. In archaeology, **excavation** means to dig systematically and carefully to expose, record, and recover buried artifacts, ecofacts, and features. Archaeologists also use special scientific methods to understand and **analyze** the things found at a site. To analyze means to study something critically and objectively in order to identify its parts and understand how they relate to each other.

Some sites involve teams of archaeologists working together. One team may find the site, another may excavate it, and yet another team will analyze the artifacts. Often an additional team then writes the report that presents the information the other teams have found. The archaeological process is slow and time-consuming work. It may take years to complete a site excavation. The final interpretation of what took place at a site may take additional years. Because it takes so much time, archaeological work can be very expensive.

Archaeologists conduct **surveys** across the landscape to find sites. Before starting, archaeologists develop a **survey strategy**, or **research design**, for the area they plan to study. They

Archaeologists survey, excavate, and research sites.



look at the archaeological information already known about the area and determine the most likely location for a site. Then they begin the survey by walking specific areas in roughly parallel straight lines or paths, called **transects**. They figure the distance between transects by determining the **probability**, or chance, of finding prehistoric sites. The probability is high along a river or near a spring, and so they space transects in those areas between 10 to 30 meters apart. On a steep mountain slope, the probability of finding a site is much lower, and so there they space transect lines 100 to 300 meters apart. Archaeologists use a compass for guidance along a transect line.

As archaeologists walk the transects, they look for artifacts on the ground or other evidence that prehistoric people may have used the area. A common find is a stone tool. It may have been left behind while it was being made, or because it was broken and no longer useful. Archaeologists

A site map is an important part of an archaeological site form. The numbered points here (1-5) represent places where archaeologists collected artifacts from the surface during a survey. *Courtesy Montana Historical Society, Flying D Ranch Archaeological Project*



Archaeological excavation units are square or rectangular because they are part of a grid. Archaeologists use screens during an excavation to sift the dug soil to recover small artifacts. *Tim Urbaniak, photographer.*

also carry a tape measure, a field notebook, and **site forms** to record information. On the site forms, they write down the artifacts they see and the location, elevation, and size of the site. They

also record how close the site is to water, and the vegetation and landscape at the site. They also sketch a map of the site, and plot it on a United States Geological Survey (U.S.G.S.) **topographic map**, showing the exact location of the site.

Archaeologists sometimes complete a survey strictly for research purposes, so that they can understand the reasons past people spent time in a certain location. Sometimes, private organizations and foundations, such as the National Science Foundation, sponsor research surveys. Other surveys are done when someone plans to develop an area. Federal land laws require surveys before development can happen, because construction activities may harm prehistoric sites. Development can include road building, dam construction, timber harvesting, and many other types of construction.

Projects not on federal land that are funded by the federal government or projects that require federal permits also must be surveyed before construction can begin. Many states have laws governing state-owned lands that require archaeological surveys. If a farmer or homebuilder uncovers an archaeological site, or if animals uproot artifacts on private land, archaeologists may also be asked to complete a survey.

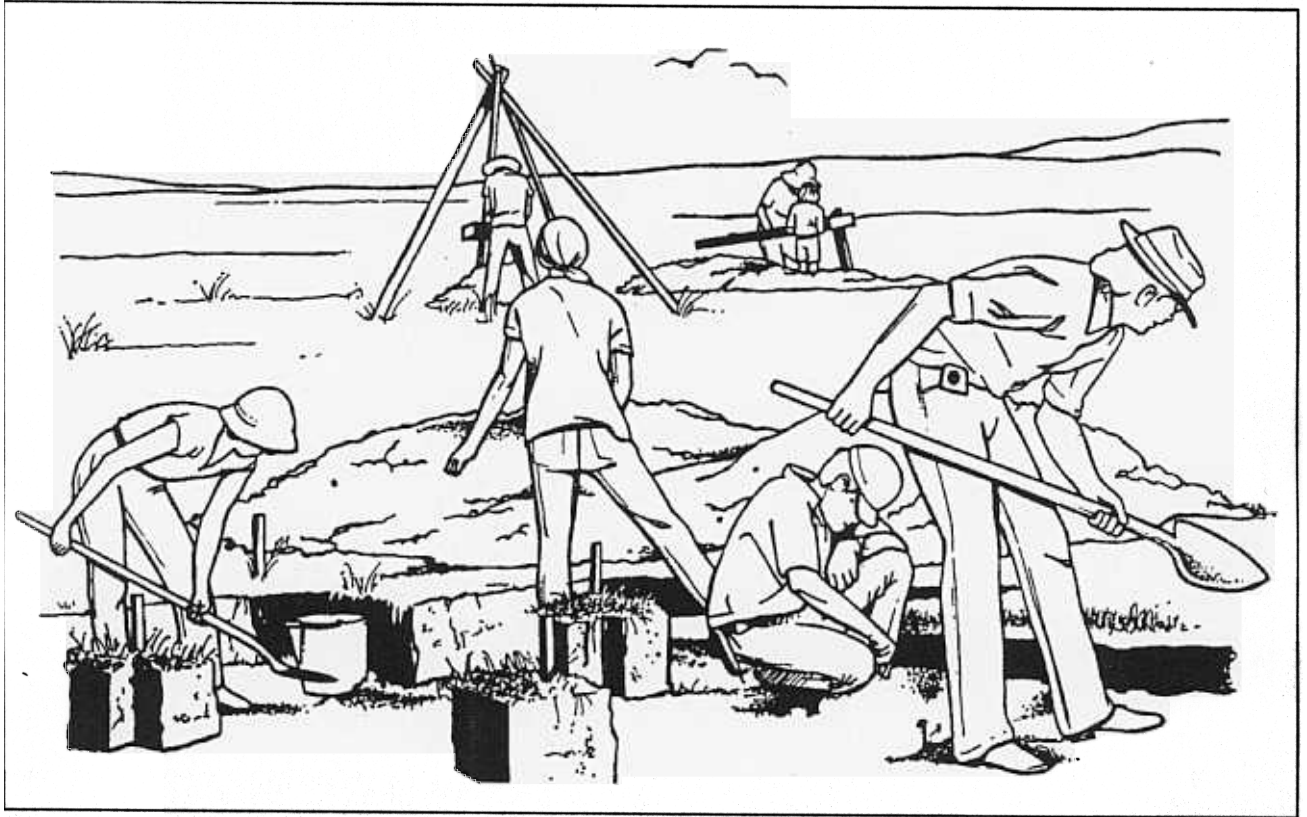
Those developing a piece of land can avoid disturbing most archaeolog-

ical sites discovered during a survey. However, if a site is found during a survey and it could be harmed by construction, the next step is to determine how important it is. A site with artifacts under the ground may be significant due to the surrounding **context** and because its features are undisturbed. Buried sites are discovered by **shovel testing**. Archaeologists dig, or excavate, a series of small holes with a shovel. Or they may use an **auger**, a drill used to bore holes in the ground. How deep archaeologists dig when shovel testing depends on a site and its artifacts. On the site form, archaeologists map all the holes they have excavated. They then place any artifacts in bags, with a separate bag for each hole and sometimes even for each depth within a hole.

Many sites contain artifacts on the surface of the ground only. Archaeologists map, and then may collect, these artifacts. Any collected artifacts are studied and placed in museums for future research. A museum may also display the artifacts.

Archaeological sites buried beneath the ground often provide a great deal of information. Artifacts may show that different groups of people, over thousands of years, used the site. The **stratigraphic layers**, or stacked levels of earth and artifacts, furnish a picture of the technology, or tools, used by a group of people, the foods they ate, how they prepared their foods, and which kinds of shelter they lived in. Archaeologists study the patterns presented in each **stratum**, or layer, to find similarities and differences in ancient people over periods of time.

For example, imagine a group of



prehistoric people that camped next to the Yellowstone River 5,000 years ago. These people cooked bison meat and left behind a rock-lined fire pit, complete with charred bison bones. One thousand years pass. Wind, rain and snow, and floods deposit soil over the ancient campsite. This layer of earth on top of the former camp is **sterile**—contains no artifacts—because no one lives there during those years. Then another prehistoric group camps at the same site. These ancient people collect plants, and they scrape and process animal hides for clothing. They leave behind a broken mano—a tool for grinding dried plants—three broken hide scrapers, and an ancient bone needle. Over the next 4,000 years, more soil builds up on the campsite. When modern-day archaeologists discover and excavate the site, they find two stratigraphic

layers of prehistoric **occupation**—evidence that two different groups of people lived here at two different times. When the archaeologists study the **strata**, or layers, they learn of the events that took place at the site at each time. If the artifacts from both layers were disturbed by a backhoe digging a trench for irrigation, the site would be confusing for archaeologists. They would find it difficult to identify the two different sets of activities at the site, and their dates. Sites that have not been disturbed provide greater information about the past than those that have been disturbed.

When a site excavation is planned, a **site director** is selected before work begins. The site director supervises all the work and first prepares an excavation **research design**. The design outlines the type of information the members of the excavation team hope

An archaeological excavation involves many people working together.
Courtesy Kansas State Historical Society.

to gather and the questions they hope to answer when studying the site. The design also establishes the excavation techniques and analysis of information the site director plans to use during the excavation. Once the design is complete, several professional archaeologists may review it to ensure that it meets archaeological standards.

After the research design has been approved, the site director selects a team of people to participate in the excavation. They may be students, professional archaeologists, or amateurs trained in archaeology. The first step for the excavation team is to clear all vegetation from the site. Then they establish a **grid**—based on the **Cartesian coordinate system**—on the surface of the ground. This grid is the team's primary recording method, helping them remember where they found each artifact and feature. Using Metric system measurements, the team sets the grid with a **transit**—an instrument used to survey horizontal and vertical angles—along with measuring tapes and wooden stakes. The stakes are placed in the corners of each square of the grid. The size of each square is often one or two meters on a side. Larger squares would provide less specific location information. Each square receives a coordinate number for identification. Once the grid is set, a site map is drawn on graph paper, with squares that match those in the grid on the ground.

Then the work of actual excavating begins. Archaeologists use shovels, trowels, small brooms and brushes, screens, and dustpans to uncover a site. They remove dirt slowly from the ground, square by square, and are careful not to destroy any archaeolog-

ical information. They record the location and depth of each artifact, ecofact, and feature on a **data sheet**, and they label each item with the corresponding square number. They shake the excavated dirt through a screen to capture small artifacts.

The archaeologists make detailed maps, drawings, notes, and photographs throughout the stages of the excavation. Once they complete the excavation, they usually back-fill the site with the dirt that was excavated. A planned construction project can then proceed.

The excavation destroys a site. Once the artifacts and features are removed from the ground, archaeologists can not return to repeat the excavation. Therefore, they must take great care to accurately record and map all information. Future research can be conducted if the data gathered during the original excavation is precise. If the data is precise, specialists do not even need to see a site to study it! The key to site interpretation is the proper recording of artifacts and features and their relationships with each other.

A site excavation is probably the least time-consuming task when archaeologists try to reconstruct the past. They must spend months, and even years, of study to analyze and interpret samples taken from a site. They send artifacts and plant and animal samples to various specialists for analysis.

Archaeologists use computers extensively. Using **statistical data analysis**, they can compare new data with that from other archaeological sites and studies. Archaeologists also turn to **ethnography**—the study of modern groups of primitive people—for clues to past people and their

technology, subsistence, and shelter. When archaeologists use information about these cultures to help reconstruct the past, they are making an **ethnographic analogy**. They may also **experimentally replicate** artifacts—that is, try to copy ancient tools—in order to better understand past cultures and how they manufactured the things they used. Archaeologists have a strong professional **ethic**, or set of values, that requires that they quickly publish the information they discover during excavations. Publication in an archaeological journal, or a book, makes current archaeological research available to everyone.

When archaeologists interpret the events they learn about during their analysis of artifacts at a site, they also date the events. They arrange the events in the order in which the events happened. They do this by **relative**

dating and **absolute dating**. Relative dating orders events in relation to each other, but does not date events to a specific time. Absolute dating places a specific time on artifacts, features, and events. There are several methods for obtaining results for both types of dating. (You will find a discussion of dating methods in Theme 3, Lesson E).

The process of archaeology is complex. It takes a great deal of time to locate, excavate, analyze, and report on a site. Archaeologists are dedicated to preserving and protecting the past through their work. The excavated artifacts may be given to a public museum, or to an Indian tribe with jurisdiction over a site, once the analysis is completed. Museums make artifacts available for future research. And in museums, artifacts may also be placed on display so that visitors can enjoy them and gain knowledge of the past

LESSON 1C—VOCABULARY: HOW DO ARCHAEOLOGISTS FIND AND STUDY ARCHAEOLOGICAL SITES?

absolute dating

analyze

auger

Cartesian coordinate system

context

data sheets

ethic

ethnographic analogy

ethnography

excavate

experimentally replicated

grid

occupation

probability

relative dating

research design

**LESSON 1C—VOCABULARY: HOW DO ARCHAEOLOGISTS FIND AND STUDY
ARCHAEOLOGICAL SITES? (CONTINUED)**

shovel testing _____

site director _____

site forms _____

sites _____

sterile _____

statistical data analysis _____

stratigraphic layers _____

stratum/strata _____

survey strategy _____

surveys _____

topographic map _____

transects _____

transit _____

LESSON 1C—ARCH ACTIVITY: SITE IN A BOX

Grades: 3–8

Time: 60 minutes+

Content Area: science, writing, math, and critical thinking

Who: individual and small groups

Materials:

4–8 cardboard boxes or plastic tubs (2 for each group)

Different types of dirt and rocks

“Artifacts”: ceramic pieces, coins, bones, dried foods, small tools, product labels, bottles, etc.

Tools: trowels, brushes, tape measures, small plastic bags, clipboard, paper, and pencils

Arch Journals

OBJECTIVE AND OUTCOME

- Students will discover the scientific process of archaeological excavation and develop ideas about past cultures.
- Students will demonstrate how archaeologists uncover, document, and analyze artifacts.
- Students will describe a culture on the basis of its artifacts.

PREPARATION

Before beginning, do the following:

1. Choose artifacts to represent several modern or historic “cultures.” Students may or may not be familiar with the artifacts. Fragments of an artifact such as a dinner plate or machine parts are intriguing for students to piece together or figure out how they worked.

2. Layer the artifacts with dirt and rocks in each site box created. Some artifacts should be left partially uncovered on the surface. Leave a layer of empty soil between each layer of artifacts. Use different types of soil, like sand and clay, to provide stratigraphic

layering. Use 15–20 artifacts per box.

3. Mark north, south, east, and west on each box using stickers.

4. Draw a line inside each box to indicate the surface level. This will be the point from which students will make their depth measurements.

ACTIVITY

1. Divide students into groups based on the number of boxes you have. Each group will need a site box and an empty box in which to put their excavated soil and rocks. Instruct students to do all writing activities in their Arch Journal (like a field notebook).

2. First, have students make a map of the site, showing artifacts where they appear undisturbed on the surface. Students should orient the map with north at the top and establish some kind of scale.

3. Once the surface of the site is mapped, begin excavating the site. Have students take turns doing the excavating and data recording. Using

trowels and brushes, carefully skim off and remove the dirt and rocks across a layer to reveal the artifacts in that layer. The students should not dig holes that cross into different layers.

4. As each artifact is uncovered, it must be documented before it is removed. Begin by giving each artifact a number (1, 2, 3, etc.). Then record information in the Arch Journal about the artifact *in situ*, which means as it appears in place:

- ~ Record the depth from the surface at which the artifact was discovered, using the surface line as a starting point of zero. Measure in centimeters.

- ~ Note any other artifacts that were found next to it. This establishes a possible relationship between artifacts.

- ~ Describe the context of the artifact. Note the soil type or what layer the artifact was found in. Soil changes resulting in distinct layers, or strata, usually indicate different periods of occupation.

5. Once the information about the location of the artifact is recorded, remove the artifact. Record information in the Arch Journal that describes the type of artifact:

- ~ Describe its material, shape, and general characteristics.

- ~ Measure its dimensions

- ~ Draw a picture of the artifact.

6. Place the artifact in a small bag labeled with the object number and where it was found. Continue excavating.

7. Once all the artifacts have been recovered and documented, the analysis of artifacts begins. Students must decide how each artifact was made and used. They must also deter-

mine which artifacts are related and why. (Hint: Artifacts within the same layer belong together and to the same time period.) Based on these conclusions, the students will write a description of the culture or cultures that left the artifacts behind.

EXTENSIONS

3–5:

- Research vocabulary.

See: Lesson 1C—Vocabulary

6–8:

- Challenge students to read an article about an archaeological excavation. Instruct them to focus on how archaeologists learned information from the artifacts—and what clues archaeologists used to interpret the activities and culture of these ancient people.